



Development of Safer Islands in the Maldives

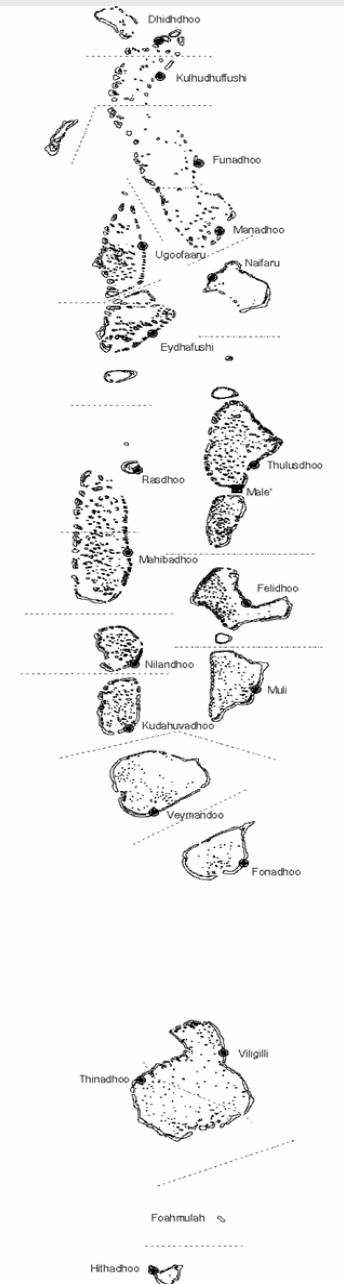
The Coastal Community Resiliency Workshop 23 -25 May 2006,
Bangkok

Presented by Thoriq Ibrahim

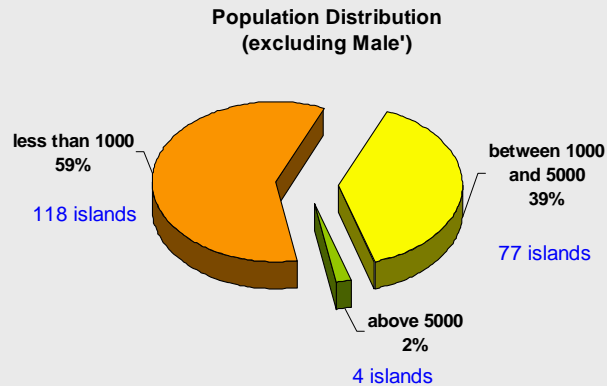
THE MALDIVES

Brief Introduction

- Population: **290,000**
 - IMR: **21/1000**
 - Life Expectancy: **71.4 yrs**
 - MMR **78/100,000**
 - Literacy: **98.9%**
 - Net primary enrollment: **95%**
 - GDP growth rate over last ten years **7-9 %**
- Total number of islands **1,192**
- Number of inhabited islands: **199**
- Land Area :300 sqkm
- **Main industries**
 - Tourism
 - Fisheries



Vulnerability Indicators



- Highest elevation **1.5m** above sea level
- **88** inhabited islands face perennial beach erosion
- Wide dispersal of population across very small islands
- Remoteness and inaccessibility of islands
- Extremely high economic dependence on tourism
- High import dependence
- High diseconomies of scale

Tsunami strikes!

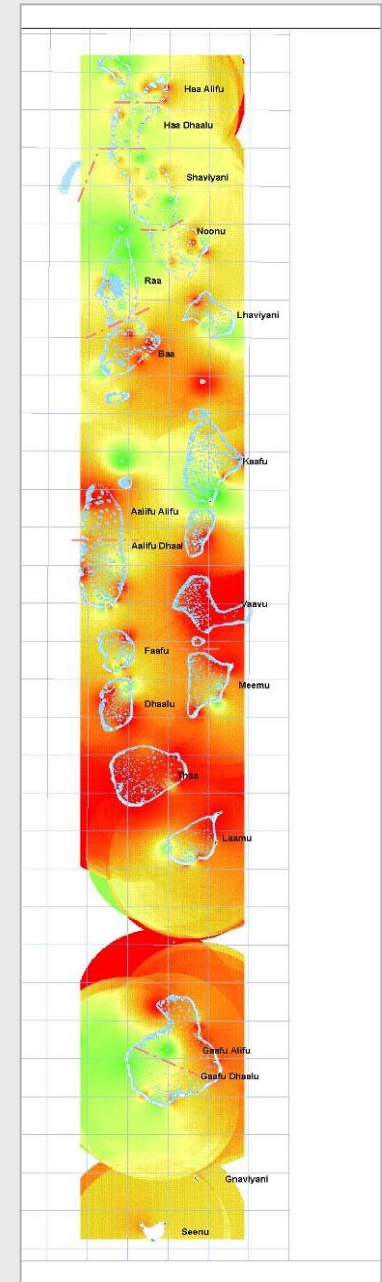
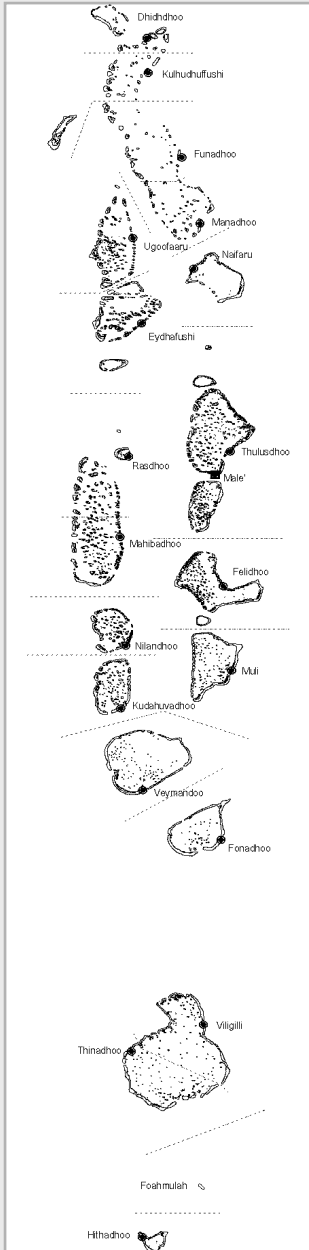
26 December 2004

Waves of up to **4 meters**
struck shortly after **9 am**
on 26 December 2004



Flooding Status after 24 Dec 2004 Tsunami

- Only **9** islands had no flooding
- **69** islands completely flooded
- This is the first biggest natural disaster in the recent history of the Maldives.



Social & Economic Infrastructure Damage

- Jetties and harbours in **104** islands.
- Electricity in **26** islands.
- Communications infrastructure in over **70** islands.
- Schools, clinics and pharmacies in over **50** islands.
- Fishing boats in **50** islands.
- **19** out of **87** resorts shutdown
- Total asset loss – approx. **62%** of **GDP**.



Damage and needs Assessment .. continued

■ Cost of responding to disaster include

- Immediate relief



- Reconstruction

 - “Safe island” concept

- Risk mitigation

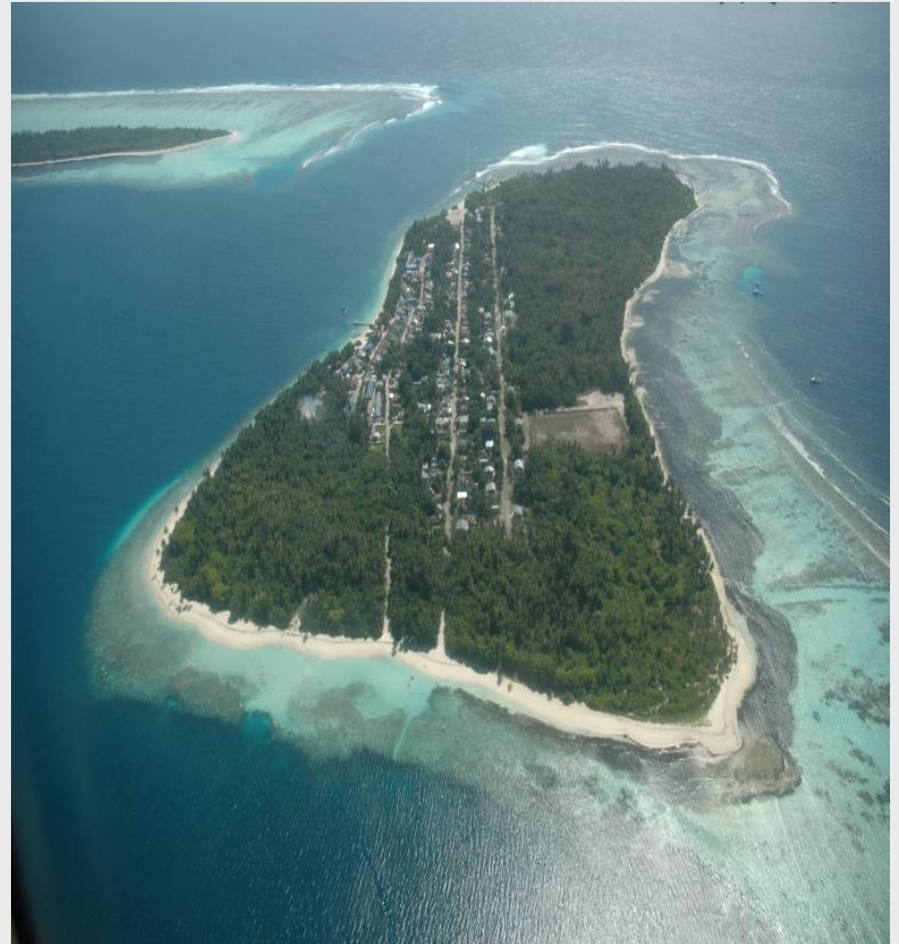
 - Better standards to reduce vulnerability



Enhancing Mitigation and Redevelopment

The Safe Islands Programme (SIP)

- Regional development and Population consolidation
- Development of larger islands with better economic opportunities



Enhancing Mitigation and Redevelopment

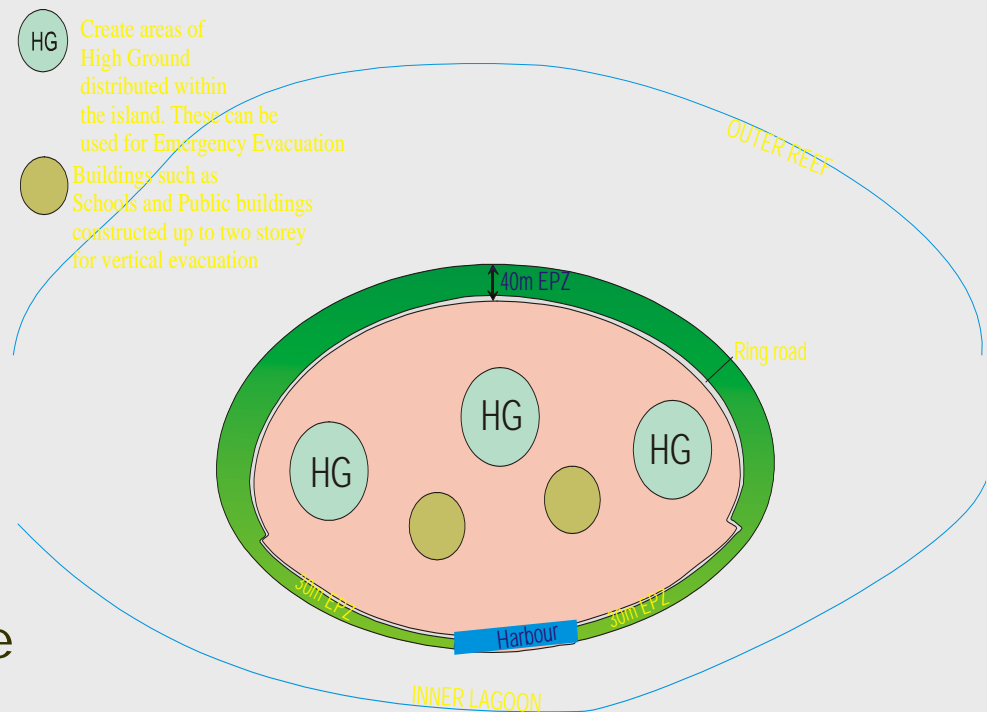
The Safe Islands Programme (SIP)

- A market driven strategy providing incentives for voluntary migration to alternative islands
- Some of the evacuated islands will not be resettled
- Strengthen environmental resilience – safe islands programme



Enhancing Mitigation Measures

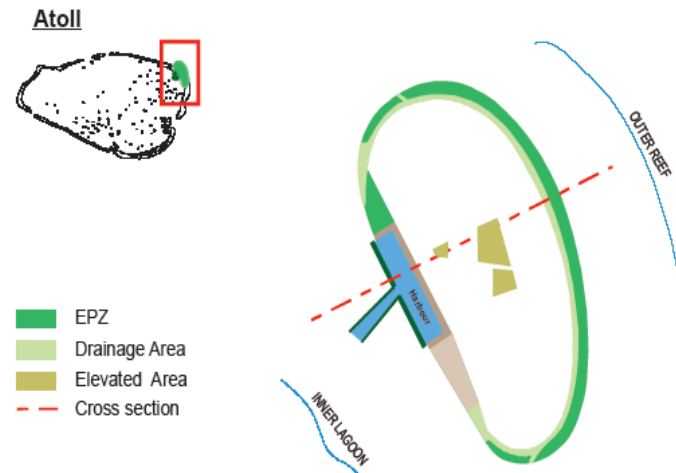
- The Maldives is inherently vulnerable to environmental disasters
- Tsunami has created new urgency in developing enhanced environmental mitigation measures
- Redesign the physical development features of islands including
 - wider environmental protection zones
 - elevated areas for vertical evacuation in the event of floods



Enhancing Mitigation Measures

- Coastal protection
- Establishment of alternative modes of communication and energy
- Transport infrastructure
- Establishing safe zones
- Buffer stock of basic foods and water
- Economic viability, social services and housing
- Each island to have disaster management plans

Conceptual Design for Enhanced Mitigation



Note: Elevated areas to be distributed within island. These can be used for Emergency Evacuation. Buildings such as Schools and Public buildings will be constructed upto two storeys for same.

Cross Section of an Island with Enhanced Mitigation Features

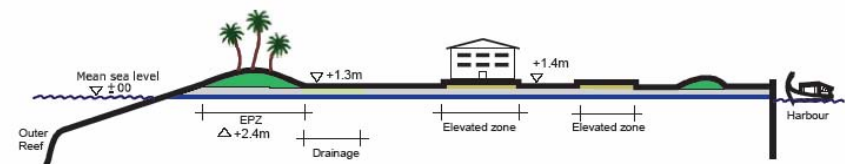
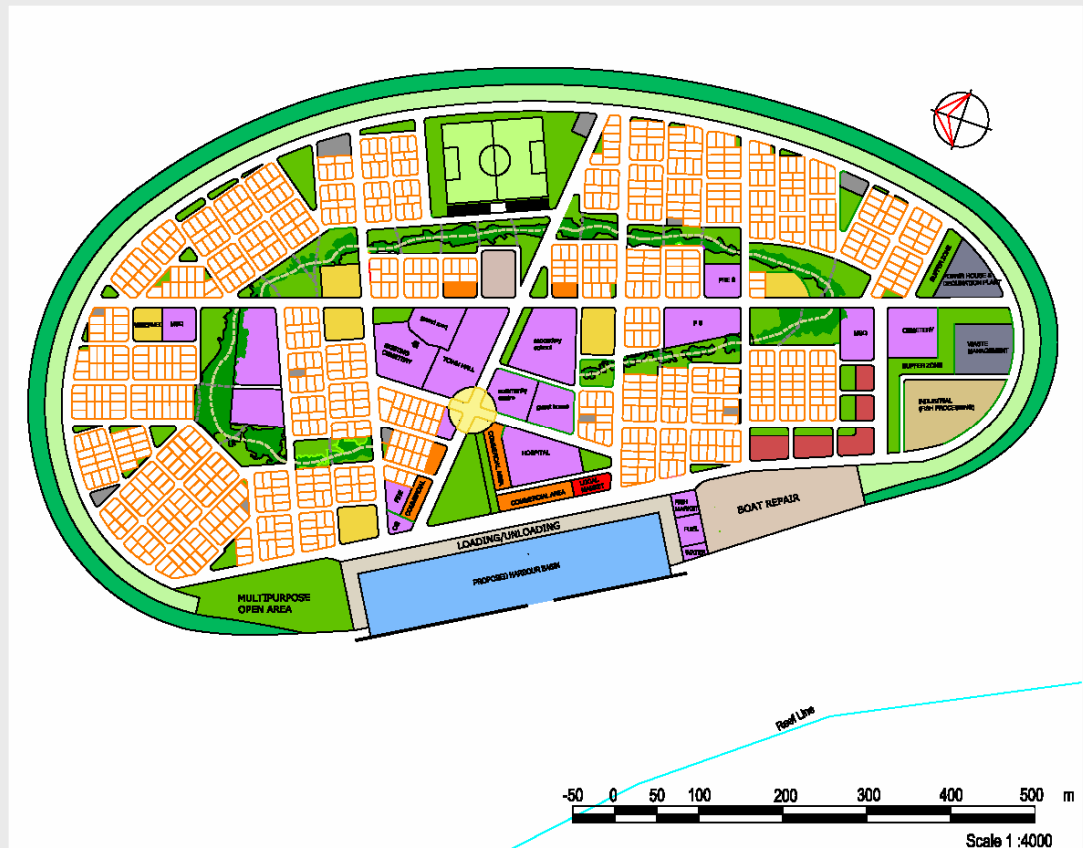


Figure 4: Cross Section of EPZ

Design of a Settlement Under Safe Island Program

- Islands are being identified
- Island development plans are being prepared
- Development would be in phases



Development of Safer Island

Housing and infrastructure design concepts.

The houses designed to be built on these islands are of better standard and can withstand or reduce the risk of damaging the house during a high tidal wave or possible tsunami striking the island.



Challenges & Constraints

- Geographical dispersion and difficulties of access to islands
- Transport and logistical difficulties
- High unit cost of delivery of construction material
- Inadequate human resource to manage projects.
- Unpredictable weather and rough seas.





The Way Forward

- Long term Adaptation & Mitigation plan
- Multi-hazard Early Warning System
- Continue Awareness, Training & Education
- Advocate at local, national, regional and international level
- Commitment from all!!!!



THANK YOU!

